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SEQUENCE LISTING

<110> Glare, Travis T
Hurst, Mark R H
Jackson, Trevor A

<120> Insecticidal Nucleotide Sequences

<130> 24747-1104US

<140> US10/070,489

<141> 2002-03-01

<150> PCT/NZ00/00174

<151> 2000-09-04

<150> NZ 337610

<151> 1999-09-02

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<212> DNA

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<222> (13908) ... (14483)

<223> ORF2

<221> misc feature

<222> (1955) ... (18937)

<223> MINIMUM SEQUENCE REQUIRED FOR PATHOGENICITY AS
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tac tgg cgc agc gcc aac cac agc aaa atc caa gac tca atg atg ccc Tyr Trp Arg Ser Ala Asn His Ser Lys Ile Gln Asp Ser Met Met Pro	1265	1270	1275	5812
gcg aat gcc tgg acc gga tgg aca aaa att aac tgc gga atg aat ccg Ala Asn Ala Trp Thr Gly Trp Thr Lys Ile Asn Cys Gly Met Asn Pro	1280	1285	1290	5860
tgg tca gat ctt gtg tgc tgc gtg ttt ttc aac agt cgc ctt tat gtc Trp Ser Asp Leu Val Cys Ser Val Phe Phe Asn Ser Arg Leu Tyr Val	1295	1300	1305	5908
gtc tgg gtc gaa gag aat cag tct gct gat acg gag gca gag agc acg Val Trp Val Glu Glu Asn Gln Ser Ala Asp Thr Glu Ala Glu Ser Thr	1310	1315	1320	5956
aca acc acg cag cag agc tac acg ctg aaa ctg tgc ttc cgg cgc tac Thr Thr Thr Gln Gln Ser Tyr Thr Leu Lys Leu Ser Phe Arg Arg Tyr	1330	1335	1340	6004
gac ggt aca tgg agt tcc ccg gtg tgc ttc gac att acc ggc aac atc Asp Gly Thr Trp Ser Ser Pro Val Ser Phe Asp Ile Thr Gly Asn Ile	1345	1350	1355	6052
gca ttt ccg gaa acg cag ggc atg cat gtg acc tgt aat ccc ctg act Ala Phe Pro Glu Thr Gln Gly Met His Val Thr Cys Asn Pro Leu Thr	1360	1365	1370	6100
gag cag ctc tat tgc gcg ttt tac tcc gtc acc agc aag ccg gac ttt Glu Gln Leu Tyr Cys Ala Phe Tyr Ser Val Thr Ser Lys Pro Asp Phe	1375	1380	1385	6148
gat aac gct cag ctg att tct gtg gat aat gat atg acg cta aat gtc Asp Asn Ala Gln Leu Ile Ser Val Asp Asn Asp Met Thr Leu Asn Val	1390	1395	1400	6196
atc tca gat ata ggg att ttt aag agc gtc agt cac gaa ttt aat acg Ile Ser Asp Ile Gly Ile Phe Lys Ser Val Ser His Glu Phe Asn Thr	1410	1415	1420	6244
agc act gag aaa ttt att aat aat gtt ttt tca gac cct tcc gct aat Ser Thr Glu Lys Phe Ile Asn Asn Val Phe Ser Asp Pro Ser Ala Asn	1425	1430	1435	6292
tat ttt gtc agt gca acg agt tta att gat gat gtt atc cac agc gat Tyr Phe Val Ser Ala Thr Ser Leu Ile Asp Asp Val Ile His Ser Asp	1440	1445	1450	6340
ttc tca ctc ctt aat tct aaa act aca agt act gtt ttt act aat gaa Phe Ser Leu Leu Asn Ser Lys Thr Thr Ser Thr Val Phe Thr Asn Glu	1455	1460	1465	6388
gat tcc tct ctt ttg acg cca gag ctt cat att aca gca aat gtt tgc Asp Ser Ser Leu Leu Thr Pro Glu Leu His Ile Thr Ala Asn Val Ser	1470	1475	1480	6436
tgt ttt gtt agt act gct ggc atc gcc act caa tct acc ata gaa aaa Cys Phe Val Ser Thr Ala Gly Ile Ala Thr Gln Ser Thr Ile Glu Lys	1490	1495	1500	6484
ttc gtt cag gca ggg ata gaa ttt gag gaa att aat ttt tat gca ggc				6532

Phe Val Gln Ala Gly Ile Glu Phe Glu Glu Ile Asn Phe Tyr Ala Gly	
1505 1510 1515	
cag gcc gcc ggc gga ttt gac gga ttt gtg gga gtg gat gtt tct aat	6580
Gln Ala Ala Gly Gly Phe Asp Gly Phe Val Gly Val Asp Val Ser Asn	
1520 1525 1530	
tca aaa gta tac cag gtc gga aaa gaa gca gtt ggt gtc act gta aaa	6628
Ser Lys Val Tyr Gln Val Gly Lys Glu Ala Val Gly Val Thr Val Lys	
1535 1540 1545	
tct tat tcc gtc act ggc gtt agt ggt tct gtt gag tta ttt att gat	6676
Ser Tyr Ser Val Thr Gly Val Ser Gly Ser Val Glu Leu Phe Ile Asp	
1550 1555 1560 1565	
tca tca aat aaa tac ttc agc gga att ttg tca gat aaa atg ata acc	6724
Ser Ser Asn Lys Tyr Phe Ser Gly Ile Leu Ser Asp Lys Met Ile Thr	
1570 1575 1580	
gct tta att agc ggc agt aca tca aaa gtt aat tac gtg tcg tct att	6772
Ala Leu Ile Ser Gly Ser Thr Ser Lys Val Asn Tyr Val Ser Ser Ile	
1585 1590 1595	
ggc tct caa gat ttt tgg agt gta aag tcg ctc atg ccg gca ctt cag	6820
Gly Ser Gln Asp Phe Trp Ser Val Lys Ser Leu Met Pro Ala Leu Gln	
1600 1605 1610	
ata tat gaa tta atc gat gat atc ata ctg aca tcc ggc gta aat ggg	6868
Ile Tyr Glu Leu Ile Asp Asp Ile Ile Leu Thr Ser Gly Val Asn Gly	
1615 1620 1625	
act gaa att aaa tcc tgg cct tcc gct gaa tgg tat aat gat aag ctg	6916
Thr Glu Ile Lys Ser Trp Pro Ser Ala Glu Trp Tyr Asn Asp Lys Leu	
1630 1635 1640 1645	
agt ctg caa tcc ggc aat aat ctt ttc aac acc aaa tcg ctg agt ttt	6964
Ser Leu Gln Ser Gly Asn Asn Leu Phe Asn Thr Lys Ser Leu Ser Phe	
1650 1655 1660	
acc gtt aat acc agt gat att gtt gaa gat gag ttt gac gtg acg ttt	7012
Thr Val Asn Thr Ser Asp Ile Val Glu Asp Glu Phe Asp Val Thr Phe	
1665 1670 1675	
acg ttc acc gct gtc gat cag aat aac gtc gtg ctg gcc gcc cgg acg	7060
Thr Phe Thr Ala Val Asp Gln Asn Asn Val Val Leu Ala Ala Arg Thr	
1680 1685 1690	
gcc ata tta acc gtc att cga aac att aat aat gac act tcc gtt atc	7108
Ala Ile Leu Thr Val Ile Arg Asn Ile Asn Asn Asp Thr Ser Val Ile	
1695 1700 1705	
gca tta cgt aaa aat acg cgt ggc gcg cag tat att cgt ttc act gcg	7156
Ala Leu Arg Lys Asn Thr Arg Gly Ala Gln Tyr Ile Arg Phe Thr Ala	
1710 1715 1720 1725	
ggt aac gat gtg gcg ctt att cgc ctc aac acc ctc ttt gcc cgc caa	7204
Gly Asn Asp Val Ala Leu Ile Arg Leu Asn Thr Leu Phe Ala Arg Gln	
1730 1735 1740	
ctg gtc gac cgg gcg aat acc ggg att gac acc att ctt tcc atg gag	7252
Leu Val Asp Arg Ala Asn Thr Gly Ile Asp Thr Ile Leu Ser Met Glu	
1745 1750 1755	
acc cag agg ctt acc gaa ccc gcc ctg gaa gag ggg agt gat gtg ttt	7300
Thr Gln Arg Leu Thr Glu Pro Ala Leu Glu Glu Gly Ser Asp Val Phe	
1760 1765 1770	

atg gac ttc tcc gga gcc aat gcc ctc tat ttc tgg gag ctg ttc tat Met Asp Phe Ser Gly Ala Asn Ala Leu Tyr Phe Trp Glu Leu Phe Tyr 1775 1780 1785	7348
tac acg ccg atg atg gtg ttc cag cgg ttg ttg cag gaa cag cac ttc Tyr Thr Pro Met Met Val Phe Gln Arg Leu Leu Gln Glu Gln His Phe 1790 1795 1800 1805	7396
ccg gaa gcc acc cgc tgg ctg cag tat gtc tgg aac ccg gcc ggg cac Pro Glu Ala Thr Arg Trp Leu Gln Tyr Val Trp Asn Pro Ala Gly His 1810 1815 1820	7444
gtg gta aac ggg gtg ctg cag aat tac acc tgg aat gtc cgt ccg ctg Val Val Asn Gly Val Leu Gln Asn Tyr Thr Trp Asn Val Arg Pro Leu 1825 1830 1835	7492
gag gag gac acc ggc tgg aac gac tcg ccg ctg gac tcc att gac ccc Glu Glu Asp Thr Gly Trp Asn Asp Ser Pro Leu Asp Ser Ile Asp Pro 1840 1845 1850	7540
gat gca ata gcc cag tac gac ccc atg cat tac aag gtc gcc acc ttt Asp Ala Ile Ala Gln Tyr Asp Pro Met His Tyr Lys Val Ala Thr Phe 1855 1860 1865	7588
atg tcg tac ctc gac ctg ctg att gcc cgc ggt gat gcc gcc tac ccg Met Ser Tyr Leu Asp Leu Leu Ile Ala Arg Gly Asp Ala Ala Tyr Arg 1870 1875 1880 1885	7636
ctg ctc gag ccg gac acc ctt aac gag gcc ccg atg tgg tac gtc cag Leu Leu Glu Arg Asp Thr Leu Asn Glu Ala Arg Met Trp Tyr Val Gln 1890 1895 1900	7684
gcc ctg aac ctt ctg ggc gac gag ccc tat att tcc ttt gac gcc gac Ala Leu Asn Leu Leu Gly Asp Glu Pro Tyr Ile Ser Phe Asp Ala Asp 1905 1910 1915	7732
tgg tcg gcg ttg acc ctg ggt gac gca gcc agc gag gtg acg cga ccg Trp Ser Ala Leu Thr Leu Gly Asp Ala Ala Ser Glu Val Thr Arg Arg 1920 1925 1930	7780
gat tac cag gag gcc ctg ctg gcc gtg cgc ccg ttg gtg ccc gct ccc Asp Tyr Gln Glu Ala Leu Leu Ala Val Arg Arg Leu Val Pro Ala Pro 1935 1940 1945	7828
gag aca ccg acg gcg aat tcc ctg acg gca ctg ttc ctc ccg cag cag Glu Thr Arg Thr Ala Asn Ser Leu Thr Ala Leu Phe Leu Pro Gln Gln 1950 1955 1960 1965	7876
aac gag gtg ctc aaa ggc tac tgg caa acc ttg gca cag ccg ctc cat Asn Glu Val Leu Lys Gly Tyr Trp Gln Thr Leu Ala Gln Arg Leu His 1970 1975 1980	7924
aac ctg cgc cac aac ctc tcc att gac ggc cag ccg ctt tcc ctg tcc Asn Leu Arg His Asn Leu Ser Ile Asp Gly Gln Pro Leu Ser Leu Ser 1985 1990 1995	7972
gtc tac gcc acg ccg tcc gaa ccg tcc gcc ctg cag agt gcc gtc gtc Val Tyr Ala Thr Pro Ser Glu Pro Ser Ala Leu Gln Ser Ala Val Val 2000 2005 2010	8020
aac agc gcg cag ggt gct gca gca ctg ccg gcc gcg gtg atg ccg ctt Asn Ser Ala Gln Gly Ala Ala Ala Leu Pro Ala Ala Val Met Pro Leu 2015 2020 2025	8068
tac agt ttc ccg gtc atg ctg gag aac gcc ccg ggg atg gtg agc ctg Tyr Ser Phe Pro Val Met Leu Glu Asn Ala Arg Gly Met Val Ser Leu 2030 2035 2040 2045	8116

ctg acc ggg ttc ggc aac aca ctg ctc ggt att acc gag cgt cag gat Leu Thr Gly Phe Gly Asn Thr Leu Leu Gly Ile Thr Glu Arg Gln Asp 2050 2055 2060	8164
gcg gag gcg ctg gcc aaa ctg ctg cag acc cag ggc agt gaa ctg ata Ala Glu Ala Leu Ala Lys Leu Leu Gln Thr Gln Gly Ser Glu Leu Ile 2065 2070 2075	8212
cgc cag ggc ctt cgc cag cag gat aac gtc ctc gag gaa atc gat gcg Arg Gln Gly Leu Arg Gln Gln Asp Asn Val Leu Glu Glu Ile Asp Ala 2080 2085 2090	8260
gat att gcc gcc ctg gag gag agc cgc cgc ggc gcg cag atg cgt ttt Asp Ile Ala Ala Leu Glu Glu Ser Arg Arg Gly Ala Gln Met Arg Phe 2095 2100 2105	8308
gaa cgt tac aaa gtg ttg tac gag gcg gac gtc aac acc ggc gaa aaa Glu Arg Tyr Lys Val Leu Tyr Glu Ala Asp Val Asn Thr Gly Glu Lys 2110 2115 2120 2125	8356
cag gcc atg gac ttg tac ctc agt tgc tcc gtg ctg tgc gca tca acc Gln Ala Met Asp Leu Tyr Leu Ser Ser Ser Val Leu Ser Ala Ser Thr 2130 2135 2140	8404
gcc gcg ctc ttt ttg gcc gag gcc gcg gcc gat atg ctg ccc aat att Ala Ala Leu Phe Leu Ala Glu Ala Ala Asp Met Leu Pro Asn Ile 2145 2150 2155	8452
tac ggg ctg gcc gtc ggg ggc tcc cgc tat ggg gca cta ttt aaa gcc Tyr Gly Leu Ala Val Gly Gly Ser Arg Tyr Gly Ala Leu Phe Lys Ala 2160 2165 2170	8500
acc gcc atc ggc atc cag gtg tcc tcc gat gcc acc cgc ata tca gcg Thr Ala Ile Gly Ile Gln Val Ser Ser Asp Ala Thr Arg Ile Ser Ala 2175 2180 2185	8548
gac aaa atc agc cag tgc gaa gtg tac cgc cgt cgc cgg gag gag tgg Asp Lys Ile Ser Gln Ser Glu Val Tyr Arg Arg Arg Arg Glu Glu Trp 2190 2195 2200 2205	8596
gaa atc cag cgt gat agt gcg cag tct gac gtg gcg cag att gat gcc Glu Ile Gln Arg Asp Ser Ala Gln Ser Asp Val Ala Gln Ile Asp Ala 2210 2215 2220	8644
cag ctg gcg gcc atg gca gtg cgc cgg gaa ggg gct gag ctg cag aaa Gln Leu Ala Ala Met Ala Val Arg Arg Glu Gly Ala Glu Leu Gln Lys 2225 2230 2235	8692
act tac ctt gag acc cag cag acc cag gca cag gcg cag ttg gca ttc Thr Tyr Leu Glu Thr Gln Gln Thr Gln Ala Gln Ala Gln Leu Ala Phe 2240 2245 2250	8740
ctg cag agt aag ttc aac aat acg gct ctg tac agc tgg ctg cgg ggc Leu Gln Ser Lys Phe Asn Asn Thr Ala Leu Tyr Ser Trp Leu Arg Gly 2255 2260 2265	8788
agg ttg tcc gcc att tat tac cag ttc tat gac ctg gca gta tcc cgc Arg Leu Ser Ala Ile Tyr Tyr Gln Phe Tyr Asp Leu Ala Val Ser Arg 2270 2275 2280 2285	8836
tgc ctg atg gcg caa cag gcc tgg cag tgg gat aaa ttc gag act agg Cys Leu Met Ala Gln Gln Ala Trp Gln Trp Asp Lys Phe Glu Thr Arg 2290 2295 2300	8884
tgc ttt atc cag ccg ggg gcc tgg atg ggg gca aat gcc ggt ctg ctg Ser Phe Ile Gln Pro Gly Ala Trp Met Gly Ala Asn Ala Gly Leu Leu	8932

2305	2310	2315	
gcc ggg gaa acc ctg atg ctg aat ctg gcg cag atg gag cag gcc tgg Ala Gly Glu Thr Leu Met Leu Asn Leu Ala Gln Met Glu Gln Ala Trp 2320 2325 2330			8980
ctg acg ggg gat gag cgg gca ata gag gtg acg cgg acg gtc tgc ctg Leu Thr Gly Asp Glu Arg Ala Ile Glu Val Thr Arg Thr Val Cys Leu 2335 2340 2345			9028
tcg gag gtc tat acc agc ctc gcg gag gat gcg gca ttc tct ctg gcc Ser Glu Val Tyr Thr Ser Leu Ala Glu Asp Ala Ala Phe Ser Leu Ala 2350 2355 2360 2365			9076
gac aag gtg gtg gaa ctg gtc agt aac ggt tcg gcc agt gcg ggt acg Asp Lys Val Val Glu Leu Val Ser Asn Gly Ser Gly Ser Ala Gly Thr 2370 2375 2380			9124
aaa agc aac gga tta cag atg gat caa cag caa ctc gag gcc acc ctg Lys Ser Asn Gly Leu Gln Met Asp Gln Gln Gln Leu Glu Ala Thr Leu 2385 2390 2395			9172
aaa ctg gct gac ctc ggt atc gcc aac gat tac ccg gtc tcc ctt gcc Lys Leu Ala Asp Leu Gly Ile Gly Asn Asp Tyr Pro Val Ser Leu Gly 2400 2405 2410			9220
acc atg agg cgc atc aaa caa ata agc gtc acg ctc ccg gcg ctg gtc Thr Met Arg Arg Ile Lys Gln Ile Ser Val Thr Leu Pro Ala Leu Val 2415 2420 2425			9268
ggc ccc tat cag gac gtc cgt gcg gtt ctc agc tac gcc gga agt atg Gly Pro Tyr Gln Asp Val Arg Ala Val Leu Ser Tyr Gly Gly Ser Met 2430 2435 2440 2445			9316
gtc atg ccc cgg ggt tgc agc gcg ctg gcg gtc tca cac gga atg aac Val Met Pro Arg Gly Cys Ser Ala Leu Ala Val Ser His Gly Met Asn 2450 2455 2460			9364
gac agc gcc caa ttc caa ctg gat ttc aat gac ccg cgt tac ctg ccg Asp Ser Gly Gln Phe Gln Leu Asp Phe Asn Asp Pro Arg Tyr Leu Pro 2465 2470 2475			9412
ttt gaa gga ctt cca gtt gat gac aca ggg acc ctg aca ctg agc ttc Phe Glu Gly Leu Pro Val Asp Asp Thr Gly Thr Leu Thr Leu Ser Phe 2480 2485 2490			9460
ccg gat gct gac gcc aaa caa cag gcg atg ctc ctc agt ctg agc gac Pro Asp Ala Asp Gly Lys Gln Gln Ala Met Leu Leu Ser Leu Ser Asp 2495 2500 2505			9508
atc atc ctg cat atc cgt tac acc att atc agc tga tag gtatcaacat Ile Ile Leu His Ile Arg Tyr Thr Ile Ile Ser * * 2510 2515 2520			9557
agcgcaggcc cccgaacgag ggcctgcgag gagactgagc atg caa aat cat caa Met Gln Asn His Gln 2525			9612
gac atg gcc att act gcc ccc acg ttg cct tcc ggg gcc ggt gcg gtc Asp Met Ala Ile Thr Ala Pro Thr Leu Pro Ser Gly Gly Gly Ala Val 2530 2535 2540			9660
acc ggg ctc aag ggt gat atc gcg gcg gca ggg ccg gat ggt gcg gcg Thr Gly Leu Lys Gly Asp Ile Ala Ala Ala Gly Pro Asp Gly Ala Ala 2545 2550 2555			9708
acc ctg agt att ccc ttg ccg gtt agc ccc ggt ccg ggt tac gcc ccc			9756

Thr	Leu	Ser	Ile	Pro	Leu	Pro	Val	Ser	Pro	Gly	Arg	Gly	Tyr	Ala	Pro		
		2560					2565					2570					
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Thr	Gly	Ala	Leu	Asn	Tyr	His	Ser	Arg	Ser	Gly	Asn	Gly	Pro	Phe	Gly		
	2575					2580					2585						
att	ggc	tgg	ggt	atc	ggc	ggt	gct	gct	gtc	cag	cgt	cgt	acg	cgc	aac	9852	
Ile	Gly	Trp	Gly	Ile	Gly	Gly	Ala	Ala	Val	Gln	Arg	Arg	Thr	Arg	Asn		
2590					2595					2600					2605		
gga	gca	cct	acc	tac	gat	gat	act	gat	gaa	ttc	acc	ggt	ccg	gac	ggt	9900	
Gly	Ala	Pro	Thr	Tyr	Asp	Asp	Thr	Asp	Glu	Phe	Thr	Gly	Pro	Asp	Gly		
				2610					2615					2620			
gag	gtg	ctg	gtg	ccg	gca	ctc	acg	gct	gct	ggc	acc	caa	gaa	gca	cgg	9948	
Glu	Val	Leu	Val	Pro	Ala	Leu	Thr	Ala	Ala	Gly	Thr	Gln	Glu	Ala	Arg		
			2625					2630					2635				
cag	gcc	acc	tca	cta	ctg	ggg	ata	aac	cca	ggc	gga	agc	ttc	aac	gtt	9996	
Gln	Ala	Thr	Ser	Leu	Leu	Gly	Ile	Asn	Pro	Gly	Gly	Ser	Phe	Asn	Val		
	2640					2645						2650					
cag	gtt	tac	cgt	tca	cgt	acg	gag	ggt	agt	ctc	agc	cgc	ctt	gag	cgt	10044	
Gln	Val	Tyr	Arg	Ser	Arg	Thr	Glu	Gly	Ser	Leu	Ser	Arg	Leu	Glu	Arg		
	2655					2660					2665						
tgg	ctg	ccc	gcc	gac	gag	aca	gaa	acg	gaa	ttt	tgg	gtg	tta	tat	acc	10092	
Trp	Leu	Pro	Ala	Asp	Glu	Thr	Glu	Thr	Glu	Phe	Trp	Val	Leu	Tyr	Thr		
2670					2675					2680					2685		
cct	gac	gga	cag	gtg	gct	ctg	ctg	ggc	cga	aac	gcg	cag	gct	cgc	atc	10140	
Pro	Asp	Gly	Gln	Val	Ala	Leu	Leu	Gly	Arg	Asn	Ala	Gln	Ala	Arg	Ile		
				2690				2695						2700			
agc	aac	ccc	aca	gcc	cca	aca	cag	acg	gcg	gtt	tgg	ctg	atg	gag	tcc	10188	
Ser	Asn	Pro	Thr	Ala	Pro	Thr	Gln	Thr	Ala	Val	Trp	Leu	Met	Glu	Ser		
			2705					2710					2715				
tcg	gta	tca	ctt	acc	ggc	gaa	cag	atg	tat	tac	caa	tac	cgt	gcg	gaa	10236	
Ser	Val	Ser	Leu	Thr	Gly	Glu	Gln	Met	Tyr	Tyr	Gln	Tyr	Arg	Ala	Glu		
		2720					2725					2730					
gat	gat	gac	ggt	tgt	gac	gag	gcg	gag	cgc	gac	gcg	cac	ccg	cag	gcc	10284	
Asp	Asp	Asp	Gly	Cys	Asp	Glu	Ala	Glu	Arg	Asp	Ala	His	Pro	Gln	Ala		
	2735				2740					2745							
ggc	gcc	caa	cgt	tat	ccg	gtg	gcg	gtc	tgg	tat	ggt	aac	cgt	cag	gcg	10332	
Gly	Ala	Gln	Arg	Tyr	Pro	Val	Ala	Val	Trp	Tyr	Gly	Asn	Arg	Gln	Ala		
2750					2755				2760					2765			
gct	cgg	acg	cta	ccg	gcg	ctg	gtg	tcg	aca	cca	tca	atg	gat	agc	tgg	10380	
Ala	Arg	Thr	Leu	Pro	Ala	Leu	Val	Ser	Thr	Pro	Ser	Met	Asp	Ser	Trp		
				2770					2775					2780			
ctg	ttt	atc	ctg	gtg	ttt	gat	tat	ggt	gag	cgt	agc	tcg	gtg	ctg	tct	10428	
Leu	Phe	Ile	Leu	Val	Phe	Asp	Tyr	Gly	Glu	Arg	Ser	Ser	Val	Leu	Ser		
			2785					2790					2795				
gaa	gcg	ccg	gcc	tgg	caa	aca	cca	gga	agt	ggg	gag	tgg	ctg	tgt	cgt	10476	
Glu	Ala	Pro	Ala	Trp	Gln	Thr	Pro	Gly	Ser	Gly	Glu	Trp	Leu	Cys	Arg		
		2800					2805					2810					
cag	gat	tgt	ttt	tcc	ggg	tat	gag	ttt	ggt	ttt	aac	ctg	cgg	act	cgc	10524	
Gln	Asp	Cys	Phe	Ser	Gly	Tyr	Glu	Phe	Gly	Phe	Asn	Leu	Arg	Thr	Arg		
	2815				2820						2825						

cgc ctg tgc cgt cag gtt ttg atg ttc cat tac cta ggt gtt ctg gcg Arg Leu Cys Arg Gln Val Leu Met Phe His Tyr Leu Gly Val Leu Ala 2830 2835 2840 2845	10572
ggg agt tcg gga gcg aat gat gcg cca gca ttg att tct cgc ctg ttg Gly Ser Ser Gly Ala Asn Asp Ala Pro Ala Leu Ile Ser Arg Leu Leu 2850 2855 2860	10620
ctg gac tac agg gaa agt cct tca ctc agt ctg ctc gag aac gtg cac Leu Asp Tyr Arg Glu Ser Pro Ser Leu Ser Leu Leu Glu Asn Val His 2865 2870 2875	10668
cag gtg gct tat gag tcg gac ggg acg tct tgt gcc ttg ccg gca ctg Gln Val Ala Tyr Glu Ser Asp Gly Thr Ser Cys Ala Leu Pro Ala Leu 2880 2885 2890	10716
gca ttg ggg tgg caa acc ttt acc ccg ccg aca ttg tcg gca tgg cag Ala Leu Gly Trp Gln Thr Phe Thr Pro Pro Thr Leu Ser Ala Trp Gln 2895 2900 2905	10764
acg cgt gac gat atg ggc aag ttg agt ttg ctt caa ccc tat cag ctt Thr Arg Asp Asp Met Gly Lys Leu Ser Leu Leu Gln Pro Tyr Gln Leu 2910 2915 2920 2925	10812
gta gac ctt aac ggc gaa ggt gtg gtg ggt atc ctg tat cag gac agc Val Asp Leu Asn Gly Glu Gly Val Val Gly Ile Leu Tyr Gln Asp Ser 2930 2935 2940	10860
ggg gcc tgg tgg tac cgt gaa ccg gta cgc cag tcg ggg gat gat ccg Gly Ala Trp Trp Tyr Arg Glu Pro Val Arg Gln Ser Gly Asp Asp Pro 2945 2950 2955	10908
gat gct gtg acc tgg ggg gcg gct gcg gcc ctg ccg aca atg ccc gct Asp Ala Val Thr Trp Gly Ala Ala Ala Leu Pro Thr Met Pro Ala 2960 2965 2970	10956
ttg cat aac agc ggc atc ctg gcg gat ctt aat ggg gat ggt ccg ctg Leu His Asn Ser Gly Ile Leu Ala Asp Leu Asn Gly Asp Gly Arg Leu 2975 2980 2985	11004
gag tgg gtc gtt acc gcc ccc ggt gtg gcg ggg atg tat gat cgc acc Glu Trp Val Val Thr Ala Pro Gly Val Ala Gly Met Tyr Asp Arg Thr 2990 2995 3000 3005	11052
ccc ggc cgc gac tgg ttg cat ttc acc ccc ctg tca gcc ttg ccc gta Pro Gly Arg Asp Trp Leu His Phe Thr Pro Leu Ser Ala Leu Pro Val 3010 3015 3020	11100
gaa tat gcg cat cca aaa gca gtg ctc gcc gat atc ctg ggg gct ggg Glu Tyr Ala His Pro Lys Ala Val Leu Ala Asp Ile Leu Gly Ala Gly 3025 3030 3035	11148
tta acg gac atg gtg ctt atc ggg ccg cgc agt gtt cgc ctc tat tcc Leu Thr Asp Met Val Leu Ile Gly Pro Arg Ser Val Arg Leu Tyr Ser 3040 3045 3050	11196
ggc aaa aac gat ggt tgg aat aaa ggg gag acc gtg cag caa acg gaa Gly Lys Asn Asp Gly Trp Asn Lys Gly Glu Thr Val Gln Gln Thr Glu 3055 3060 3065	11244
aga ctc act ctg ccg gtc ccg ggg gtt gac cca cgt acc ctc gtg gcg Arg Leu Thr Leu Pro Val Pro Gly Val Asp Pro Arg Thr Leu Val Ala 3070 3075 3080 3085	11292
ttc agt gat atg gct ggc agt gga cag cag cat ttg acg gag gtg cgt Phe Ser Asp Met Ala Gly Ser Gly Gln Gln His Leu Thr Glu Val Arg 3090 3095 3100	11340

gct aat gga gta cgt tac tgg cca aac ctg ggg cac ggt cgt ttc ggt Ala Asn Gly Val Arg Tyr Trp Pro Asn Leu Gly His Gly Arg Phe Gly	11388
3105 3110 3115	
cag ccg gtg aat att ccc ggt ttt agc cag tca gtg act acg ttt aac Gln Pro Val Asn Ile Pro Gly Phe Ser Gln Ser Val Thr Thr Phe Asn	11436
3120 3125 3130	
cct gac cag ata ttg ctg gcc gat acc gac ggt tcc ggt acc acg gac Pro Asp Gln Ile Leu Leu Ala Asp Thr Asp Gly Ser Gly Thr Thr Asp	11484
3135 3140 3145	
ctg att tat gcg atg agt gac cgg tta gtc att tat ttc aac cag agt Leu Ile Tyr Ala Met Ser Asp Arg Leu Val Ile Tyr Phe Asn Gln Ser	11532
3150 3155 3160 3165	
ggt aat tat ttc gcc gag ccg cat acg ctg ctc ttg ccg aaa ggt gtg Gly Asn Tyr Phe Ala Glu Pro His Thr Leu Leu Leu Pro Lys Gly Val	11580
3170 3175 3180	
cgc tat gat cgc acc tgc agt ctg caa gtg gcg gat atc cag ggg ctg Arg Tyr Asp Arg Thr Cys Ser Leu Gln Val Ala Asp Ile Gln Gly Leu	11628
3185 3190 3195	
ggg gtg cct agc ctg tta ctg acg gtc ccc cat gtc gcg cct cat cac Gly Val Pro Ser Leu Leu Leu Thr Val Pro His Val Ala Pro His His	11676
3200 3205 3210	
tgg gtg tgc cat tta tgc gca gac aaa ccc tgg ttg ttg aat ggc atg Trp Val Cys His Leu Ser Ala Asp Lys Pro Trp Leu Leu Asn Gly Met	11724
3215 3220 3225	
aac aac aat atg ggg gcc ccg cat gca ctg cac tat cgc agt tgc gtg Asn Asn Asn Met Gly Ala Arg His Ala Leu His Tyr Arg Ser Ser Val	11772
3230 3235 3240 3245	
cag ttc tgg ctg gat gag aaa gcc gag gca ctg gcg gca ggc agt tcc Gln Phe Trp Leu Asp Glu Lys Ala Glu Ala Leu Ala Ala Gly Ser Ser	11820
3250 3255 3260	
cct gcc tgc tac ctg cca ttt aca ttg cat acc ctg tgg cgt tgc gtg Pro Ala Cys Tyr Leu Pro Phe Thr Leu His Thr Leu Trp Arg Ser Val	11868
3265 3270 3275	
gtg cag gat gag atc acc ggt aac cgt ctg gtc agc gac gtg ctt tat Val Gln Asp Glu Ile Thr Gly Asn Arg Leu Val Ser Asp Val Leu Tyr	11916
3280 3285 3290	
cgc cac ggc gtc tgg gac ggg cag gaa cgc gag ttt cgg ggg ttt ggt Arg His Gly Val Trp Asp Gly Gln Glu Arg Glu Phe Arg Gly Phe Gly	11964
3295 3300 3305	
ttt gtt gag atc agg gat acc gat acc ttg gca agc cag ggt acg gcg Phe Val Glu Ile Arg Asp Thr Asp Thr Leu Ala Ser Gln Gly Thr Ala	12012
3310 3315 3320 3325	
acg gaa ctg agt atg cct tct gtg agc cgg aac tgg tat gcc acc ggg Thr Glu Leu Ser Met Pro Ser Val Ser Arg Asn Trp Tyr Ala Thr Gly	12060
3330 3335 3340	
gta ccg gca gta gac gag cgt ctg ccg gag acg tat tgg caa aac gat Val Pro Ala Val Asp Glu Arg Leu Pro Glu Thr Tyr Trp Gln Asn Asp	12108
3345 3350 3355	
gcc gcc gct ttt gcc gat ttc gcg acc cgt ttc act gtc ggt tca gga Ala Ala Ala Phe Ala Asp Phe Ala Thr Arg Phe Thr Val Gly Ser Gly	12156

3360	3365	3370	
gag gat gag cag aca tat act ccg gac gac agc aag aca ttc tgg ttg Glu Asp Glu Gln Thr Tyr Thr Pro Asp Asp Ser Lys Thr Phe Trp Leu 3375 3380 3385			12204
cag cga gcc ctg aaa ggc atc ctg ctg cgc agt gag tta tac ggt gcc Gln Arg Ala Leu Lys Gly Ile Leu Leu Arg Ser Glu Leu Tyr Gly Ala 3390 3395 3400 3405			12252
gat ggc agc agc cag gcc gat atc cct tac agc gtc act gag tct cgc Asp Gly Ser Ser Gln Ala Asp Ile Pro Tyr Ser Val Thr Glu Ser Arg 3410 3415 3420			12300
ccg cag gta cgg cta gtt gaa gcg aat gga gac tac ccg gtg gtg tgg Pro Gln Val Arg Leu Val Glu Ala Asn Gly Asp Tyr Pro Val Val Trp 3425 3430 3435			12348
ccg atg ggc gcg gaa agc cgt acg tca gtt tat gaa cgg tac cac aat Pro Met Gly Ala Glu Ser Arg Thr Ser Val Tyr Glu Arg Tyr His Asn 3440 3445 3450			12396
gat cct caa tgc caa cag cag gcg gta ctc ctc agt gat gaa tac ggt Asp Pro Gln Cys Gln Gln Gln Ala Val Leu Leu Ser Asp Glu Tyr Gly 3455 3460 3465			12444
ttc cca ctg cgt cag gtc agt gtc aat tat cca cga cgc cct ccg tgc Phe Pro Leu Arg Gln Val Ser Val Asn Tyr Pro Arg Arg Pro Pro Ser 3470 3475 3480 3485			12492
gcg gac aat cca tat ccg gcg tcc tta ccg gcg acg ctg ttc gcc aac Ala Asp Asn Pro Tyr Pro Ala Ser Leu Pro Ala Thr Leu Phe Ala Asn 3490 3495 3500			12540
agt tat gac gag cag cag cag ata tta cgc ctg ggg ttg caa cag agc Ser Tyr Asp Glu Gln Gln Gln Ile Leu Arg Leu Gly Leu Gln Gln Ser 3505 3510 3515			12588
agt gca cat cac ctt gtt tca ctg tct gag ggg cat tgg ttg ttg ggg Ser Ala His His Leu Val Ser Leu Ser Glu Gly His Trp Leu Leu Gly 3520 3525 3530			12636
ttg gcg gag gcg tgc cgg gac gat gta ttc acg tac tct gcg gac aac Leu Ala Glu Ala Ser Arg Asp Asp Val Phe Thr Tyr Ser Ala Asp Asn 3535 3540 3545			12684
gtg ccg gaa ggg ggt ctg acg ctg gaa cac ctg ttg gcg ccc gaa agc Val Pro Glu Gly Gly Leu Thr Leu Glu His Leu Leu Ala Pro Glu Ser 3550 3555 3560 3565			12732
ctg gtc tgc gat agt cag gtc ggt acg ctg gcg ggt cag cag caa gtc Leu Val Ser Asp Ser Gln Val Gly Thr Leu Ala Gly Gln Gln Gln Val 3570 3575 3580			12780
tgg tat ctg gat tca caa gac gtt gcc acc gtc gct gct ccg cca ctc Trp Tyr Leu Asp Ser Gln Asp Val Ala Thr Val Ala Ala Pro Pro Leu 3585 3590 3595			12828
ccc ccc aag gta gct ttt atc gaa acg gcc gtg ctg gat gag ggt atg Pro Pro Lys Val Ala Phe Ile Glu Thr Ala Val Leu Asp Glu Gly Met 3600 3605 3610			12876
gtc agt tca ctg gct gcc tac att gtg gat gaa cat ctc gag caa gcc Val Ser Ser Leu Ala Ala Tyr Ile Val Asp Glu His Leu Glu Gln Ala 3615 3620 3625			12924
ggt tac cgg caa tcc gga tac ctt ttc cct cga ggc agg gaa gca gaa			12972

Gly Tyr Arg Gln Ser	Gly Tyr Leu Phe Pro	Arg Gly Arg Glu Ala Glu	
3630	3635	3640 3645	
cag gca ttg tgg acc cag tgt cag gga tat gtt acc tat gcc ggc gca			13020
Gln Ala Leu Trp Thr Gln Cys Gln Gly Tyr Val Thr Tyr Ala Gly Ala			
	3650 3655	3660	
gag cat ttc tgg cta ccg cta tcc ttt cgg gac agt atg ttg acc ggc			13068
Glu His Phe Trp Leu Pro Leu Ser Phe Arg Asp Ser Met Leu Thr Gly			
	3665 3670	3675	
cca gtt acc gtg acg cgt gac gcg tac gac tgc gtc atc acg cag tgg			13116
Pro Val Thr Val Thr Arg Asp Ala Tyr Asp Cys Val Ile Thr Gln Trp			
	3680 3685	3690	
cag gat gcc gca ggg att gtc acc aca gcc gac tat gac tgg cgc ttc			13164
Gln Asp Ala Ala Gly Ile Val Thr Thr Ala Asp Tyr Asp Trp Arg Phe			
	3695 3700	3705	
ctg acg ccc gtc cgg gtg acg gac ccc aat gat aat ctg cag tcc gtc			13212
Leu Thr Pro Val Arg Val Thr Asp Pro Asn Asp Asn Leu Gln Ser Val			
	3710 3715	3720 3725	
act ctg gat gct ctg ggc cgg gtg acc acc ctg cga ttc tgg ggc acg			13260
Thr Leu Asp Ala Leu Gly Arg Val Thr Thr Leu Arg Phe Trp Gly Thr			
	3730 3735	3740	
gag aat ggt att gcc acc ggt tac agt gat gcc acg ttg tcc gtt ccg			13308
Glu Asn Gly Ile Ala Thr Gly Tyr Ser Asp Ala Thr Leu Ser Val Pro			
	3745 3750	3755	
gac ggc gca gca gcc gct ctg gcg ttg acg gcg ccc cta cca gta gca			13356
Asp Gly Ala Ala Ala Ala Leu Ala Leu Thr Ala Pro Leu Pro Val Ala			
	3760 3765	3770	
cag tgt ctg gtg tat gtc acg gac agt tgg gga gat gac gac aat gag			13404
Gln Cys Leu Val Tyr Val Thr Asp Ser Trp Gly Asp Asp Asp Asn Glu			
	3775 3780	3785	
aaa atg ccc ccg cac gtg gtc gtg ctg gct acc gat cgc tat gac agt			13452
Lys Met Pro Pro His Val Val Val Leu Ala Thr Asp Arg Tyr Asp Ser			
	3790 3795	3800 3805	
gat acc gga cag cag gtc cgc caa cag gtg aca ttc agt gac ggt ttt			13500
Asp Thr Gly Gln Gln Val Arg Gln Gln Val Thr Phe Ser Asp Gly Phe			
	3810 3815	3820	
ggg cgt gag ttg caa tcg gca acc cgg cag gcc gag ggc aac gcc tgg			13548
Gly Arg Glu Leu Gln Ser Ala Thr Arg Gln Ala Glu Gly Asn Ala Trp			
	3825 3830	3835	
caa cga gga cgc gac ggc aaa ctg gtg acg gcc agt gac gga ttg ccg			13596
Gln Arg Gly Arg Asp Gly Lys Leu Val Thr Ala Ser Asp Gly Leu Pro			
	3840 3845	3850	
gtc act gta gca acg aat ttc cgc tgg gcg gtc acc ggg agg gcg gag			13644
Val Thr Val Ala Thr Asn Phe Arg Trp Ala Val Thr Gly Arg Ala Glu			
	3855 3860	3865	
tat gac aat aaa ggt ctg cct gtt cgg gtt tat cag ccg tat ttt ctg			13692
Tyr Asp Asn Lys Gly Leu Pro Val Arg Val Tyr Gln Pro Tyr Phe Leu			
	3870 3875	3880 3885	
gac agt tgg caa tat gtc agt gat gac agt gcc cgc cag gac ctg tat			13740
Asp Ser Trp Gln Tyr Val Ser Asp Asp Ser Ala Arg Gln Asp Leu Tyr			
	3890 3895	3900	

gcc gac acg cac ttt tac gat ccg acg gca cgg gaa tgg cag gtt att 13788
 Ala Asp Thr His Phe Tyr Asp Pro Thr Ala Arg Glu Trp Gln Val Ile
 3905 3910 3915

acg gca aaa ggt gaa cgg cga cag gtg ctg tat acc ccg tgg ttt gtg 13836
 Thr Ala Lys Gly Glu Arg Arg Gln Val Leu Tyr Thr Pro Trp Phe Val
 3920 3925 3930

gtc agt gaa gac gag aat gat acc gtt ggg cta aac gac gca tcc tga 13884
 Val Ser Glu Asp Glu Asn Asp Thr Val Gly Leu Asn Asp Ala Ser *
 3935 3940 3945

ctgggaagga gggggggacg gtg atg agt ccg tgg ccc ctg aca ggc gct gcc 13937
 Met Ser Pro Ser Pro Leu Thr Gly Ala Ala
 3950 3955

ctg atg gag aca aag atg aaa ata cac tat cag gtt gcg gcg gtt gtg 13985
 Leu Met Glu Thr Lys Met Lys Ile His Tyr Gln Val Ala Ala Val Val
 3960 3965 3970

ctg aca ggt gtt atg gtt tgg ggg ctt tcc cat tgg cgt tac acc gtc 14033
 Leu Thr Gly Val Met Val Trp Gly Leu Ser His Trp Arg Tyr Thr Val
 3975 3980 3985 3990

ggt tac cac gcg gca gat act caa tgg caa caa cgc cag gcc gaa cag 14081
 Gly Tyr His Ala Ala Asp Thr Gln Trp Gln Gln Arg Gln Ala Glu Gln
 3995 4000 4005

gaa agg gcc gat gcg ttg gcc ctc ctg gca gca gaa acc ccg gaa aga 14129
 Glu Arg Ala Asp Ala Leu Ala Leu Leu Ala Ala Glu Thr Arg Glu Arg
 4010 4015 4020

aag tgg gag cag caa cga cag act gac atg aac aag gtg gct ata cat 14177
 Lys Trp Glu Gln Gln Arg Gln Thr Asp Met Asn Lys Val Ala Ile His
 4025 4030 4035

gct gaa gaa gaa ctg gct gct gcg cgt gac gct gcc gct gat gct cag 14225
 Ala Glu Glu Glu Leu Ala Ala Ala Arg Asp Ala Ala Asp Ala Gln
 4040 4045 4050

cgc act ggt cag cgc ctg cag cac acc gtt acc acc ctc cag ccg caa 14273
 Arg Thr Gly Gln Arg Leu Gln His Thr Val Thr Thr Leu Gln Arg Gln
 4055 4060 4065 4070

ctt gcc agt cgt gaa acc cgc cgc ctt tcc gca gct acc gct atc ggt 14321
 Leu Ala Ser Arg Glu Thr Arg Arg Leu Ser Ala Ala Thr Ala Ile Gly
 4075 4080 4085

aca gac gac ctc gga ggc caa ccc ggc gtt ttg ttt gcc gaa ctg ttc 14369
 Thr Asp Asp Leu Gly Gly Gln Pro Gly Val Leu Phe Ala Glu Leu Phe
 4090 4095 4100

cgc cgc gct gac cag aga gcg gga gag ctg gca gcg tat gct gac agg 14417
 Arg Arg Ala Asp Gln Arg Ala Gly Glu Leu Ala Ala Tyr Ala Asp Arg
 4105 4110 4115

acc aga gtg aaa tgg cag gcc tgc ggg cgc gcc tat cag gcg gct acg 14465
 Thr Arg Val Lys Trp Gln Ala Cys Gly Arg Ala Tyr Gln Ala Ala Thr
 4120 4125 4130

cac gaa gca gaa aaa taa ggcgatttag ccgttaagga aaagtgcg 14513
 His Glu Ala Glu Lys *
 4135

tgttttcgcg attaatatta acaggagatc ac atg agc aca tcc ttg ttc agt 14566
 Met Ser Thr Ser Leu Phe Ser
 4140 4145

agc acc ccg tcg gtc gcg gtg ctc gac aac cgc ggc ctg ttg gtg cgg	14614
Ser Thr Pro Ser Val Ala Val Leu Asp Asn Arg Gly Leu Leu Val Arg	
4150 4155 4160	
gag ctg cag tac tac cgc cat ccg gat aca ccg gag gag acg gac gag	14662
Glu Leu Gln Tyr Tyr Arg His Pro Asp Thr Pro Glu Glu Thr Asp Glu	
4165 4170 4175	
cgt atc acc tgc cat cag cac gat gag cgc ggc agc ttg tca caa agc	14710
Arg Ile Thr Cys His Gln His Asp Glu Arg Gly Ser Leu Ser Gln Ser	
4180 4185 4190	
gcc gac ccg cgg tta cac gcg gcc ggt ctg aca aat ttc acg tac ctg	14758
Ala Asp Pro Arg Leu His Ala Ala Gly Leu Thr Asn Phe Thr Tyr Leu	
4195 4200 4205 4210	
aat agc ctg acc ggg aca gta ctg cag agc gtc agc gcc gat gcc ggt	14806
Asn Ser Leu Thr Gly Thr Val Leu Gln Ser Val Ser Ala Asp Ala Gly	
4215 4220 4225	
acg tcg ctg gaa ctg agc gat gcc gcc ggg cgg gcg ttt ctg gcc gtc	14854
Thr Ser Leu Glu Leu Ser Asp Ala Ala Gly Arg Ala Phe Leu Ala Val	
4230 4235 4240	
acc ggg gct ggg acg gaa gac gcg gtc acc cgc acc tgg caa tat gaa	14902
Thr Gly Ala Gly Thr Glu Asp Ala Val Thr Arg Thr Trp Gln Tyr Glu	
4245 4250 4255	
gac gat acc ctg ccg ggc cgc ccg ctg agc atc acc gag cag gtt acc	14950
Asp Asp Thr Leu Pro Gly Arg Pro Leu Ser Ile Thr Glu Gln Val Thr	
4260 4265 4270	
ggt gaa gcc gcc caa att acg gaa cgc ttc gtg tac gct ggc aat acg	14998
Gly Glu Ala Ala Gln Ile Thr Glu Arg Phe Val Tyr Ala Gly Asn Thr	
4275 4280 4285 4290	
gat gcc gag aag att ctc aat ctg gct ggc cag tgt gtc agt cat tac	15046
Asp Ala Glu Lys Ile Leu Asn Leu Ala Gly Gln Cys Val Ser His Tyr	
4295 4300 4305	
gat acc gcc gga ctg gtg cag acg gac agc atc gcc ctg agc gcc gtg	15094
Asp Thr Ala Gly Leu Val Gln Thr Asp Ser Ile Ala Leu Ser Gly Val	
4310 4315 4320	
ccg ctc gcc gtc acg cgg cag ttg ctg ccc gac gcg gcg ggg gcc aac	15142
Pro Leu Ala Val Thr Arg Gln Leu Leu Pro Asp Ala Ala Gly Ala Asn	
4325 4330 4335	
tgg atg ggt gag gat gcc tcg gcc tgg aat gac ctg ctg gat ggg gag	15190
Trp Met Gly Glu Asp Ala Ser Ala Trp Asn Asp Leu Leu Asp Gly Glu	
4340 4345 4350	
acg ttc ttc acc cag acc cac gct gat gcg acc ggc gcc gtc ctg agc	15238
Thr Phe Phe Thr Gln Thr His Ala Asp Ala Thr Gly Ala Val Leu Ser	
4355 4360 4365 4370	
atc acc gat gca aaa ggt aat ctg cag cgt gtg gca tat gat gtg gct	15286
Ile Thr Asp Ala Lys Gly Asn Leu Gln Arg Val Ala Tyr Asp Val Ala	
4375 4380 4385	
ggg ctg cta tcg ggc agt tgg ttg acg ctg aag gac ggc acg gag cag	15334
Gly Leu Leu Ser Gly Ser Trp Leu Thr Leu Lys Asp Gly Thr Glu Gln	
4390 4395 4400	
gtc atc gtg gcc tcc ctg acg tac tcg gcc gcc ggg aaa aag ttg cgt	15382
Val Ile Val Ala Ser Leu Thr Tyr Ser Ala Ala Gly Lys Lys Leu Arg	

4405	4410	4415	
gaa gaa cac ggc aac ggc gtg gta acc tcg tat att tac gag ccg gaa Glu Glu His Gly Asn Gly Val Val Thr Ser Tyr Ile Tyr Glu Pro Glu 4420 4425 4430			15430
aca cag cgc ctg acg ggg att aaa acg gaa cgt ccg tct ggg cac gtt Thr Gln Arg Leu Thr Gly Ile Lys Thr Glu Arg Pro Ser Gly His Val 4435 4440 4445 4450			15478
gcc gga gca aaa gtg ctg cag gac ctg cgc tat acg tat gac ccg gta Ala Gly Ala Lys Val Leu Gln Asp Leu Arg Tyr Thr Tyr Asp Pro Val 4455 4460 4465			15526
ggc aac gta ctc agc gtc aat aac gat gcg gaa gag acc cgc ttc tgg Gly Asn Val Leu Ser Val Asn Asn Asp Ala Glu Glu Thr Arg Phe Trp 4470 4475 4480			15574
cgt aac cag aaa gtg gta ccg gag aat acg tac atc tac gac agc ctg Arg Asn Gln Lys Val Val Pro Glu Asn Thr Tyr Ile Tyr Asp Ser Leu 4485 4490 4495			15622
tac cag ctg gtc agc gcc aca ggg cgt gag atg gcc aat gcc ggc cag Tyr Gln Leu Val Ser Ala Thr Gly Arg Glu Met Ala Asn Ala Gly Gln 4500 4505 4510			15670
cag ggc aac gac tta cca tcc gct aca gcc ccc ctt cct aca gac agc Gln Gly Asn Asp Leu Pro Ser Ala Thr Ala Pro Leu Pro Thr Asp Ser 4515 4520 4525 4530			15718
tct gcc tac acc aat tac acg cgc acc tac cgt tat gac cgt ggt ggc Ser Ala Tyr Thr Asn Tyr Thr Arg Thr Tyr Arg Tyr Asp Arg Gly Gly 4535 4540 4545			15766
aac ctg acg cag atg cgc cac agt gcc cct gcc acg aac aat aat tat Asn Leu Thr Gln Met Arg His Ser Ala Pro Ala Thr Asn Asn Asn Tyr 4550 4555 4560			15814
acg aca gac atc acg gtt agt gac cgc agc aat agg gcg gta ctg agc Thr Thr Asp Ile Thr Val Ser Asp Arg Ser Asn Arg Ala Val Leu Ser 4565 4570 4575			15862
acg ttg gcg gaa gtg ccg tca gat gtt gat atg ctg ttc agt gca gga Thr Leu Ala Glu Val Pro Ser Asp Val Asp Met Leu Phe Ser Ala Gly 4580 4585 4590			15910
ggt cac cag aag cac ctg cag ccg ggg caa gca ctg gtg tgg acg cca Gly His Gln Lys His Leu Gln Pro Gly Gln Ala Leu Val Trp Thr Pro 4595 4600 4605 4610			15958
cgt gga gaa ctg caa aag gtg aca ccg gtg gtg cgt gat ggg ggg gcg Arg Gly Glu Leu Gln Lys Val Thr Pro Val Val Arg Asp Gly Gly Ala 4615 4620 4625			16006
gac gac agc gaa agc tat cgg tat gat gcg ggc agt cag cgt att atc Asp Asp Ser Glu Ser Tyr Arg Tyr Asp Ala Gly Ser Gln Arg Ile Ile 4630 4635 4640			16054
aaa acc ggc acg cgg caa act ggc aac aac gtt cag aca cag cgg gta Lys Thr Gly Thr Arg Gln Thr Gly Asn Asn Val Gln Thr Gln Arg Val 4645 4650 4655			16102
gtg tac ctg ccg ggg ctg gag tta cgt atc atg gca aat ggc gtg acg Val Tyr Leu Pro Gly Leu Glu Leu Arg Ile Met Ala Asn Gly Val Thr 4660 4665 4670			16150
gaa aaa gaa agc ctg cag gtt att acg gtg ggc gag gct ggg ccg gca			16198

Glu Lys Glu Ser Leu Gln Val Ile Thr Val Gly Glu Ala Gly Arg Ala	
4675	4680 4685 4690
caa gtg cgc gta ttg cac tgg gag atc ggc aag ccg gat gac ctc gat	16246
Gln Val Arg Val Leu His Trp Glu Ile Gly Lys Pro Asp Asp Leu Asp	
4695	4700 4705
gag gac tcg gtg cgt tac agt tac gat aac ctg gtg ggc agc agc cag	16294
Glu Asp Ser Val Arg Tyr Ser Tyr Asp Asn Leu Val Gly Ser Ser Gln	
4710	4715 4720
ctg gag ctg gac aga gag ggt tac ctt atc agt gag gag gag ttc tac	16342
Leu Glu Leu Asp Arg Glu Gly Tyr Leu Ile Ser Glu Glu Glu Phe Tyr	
4725	4730 4735
ccg tat ggc gga acg gct gtt ctg acg gcg cga agt gag gtt gag gct	16390
Pro Tyr Gly Gly Thr Ala Val Leu Thr Ala Arg Ser Glu Val Glu Ala	
4740	4745 4750
gac tac aaa act atc cga tac tca ggc aag gag cgt gac gcg acg ggg	16438
Asp Tyr Lys Thr Ile Arg Tyr Ser Gly Lys Glu Arg Asp Ala Thr Gly	
4755	4760 4765 4770
ctg gat tat tac ggt tat cgg tat tac cag cca tgg gca ggg cgc tgg	16486
Leu Asp Tyr Tyr Gly Tyr Arg Tyr Tyr Gln Pro Trp Ala Gly Arg Trp	
4775	4780 4785
ctc tcc acg gac ccg gca ggc acg gtg gac ggg ctg aac ctg ttc cgc	16534
Leu Ser Thr Asp Pro Ala Gly Thr Val Asp Gly Leu Asn Leu Phe Arg	
4790	4795 4800
atg gtg cgg aat aat ccc gtc acg ctg ttt gac agc aac ggg cgg atc	16582
Met Val Arg Asn Asn Pro Val Thr Leu Phe Asp Ser Asn Gly Arg Ile	
4805	4810 4815
agt act ggt cag gag gcc aga cga tta gtg ggg gaa gca ttt gtt cat	16630
Ser Thr Gly Gln Glu Ala Arg Arg Leu Val Gly Glu Ala Phe Val His	
4820	4825 4830
ccg tta cac atg cct gtt ttt gaa aga att tct gta gag aga aag att	16678
Pro Leu His Met Pro Val Phe Glu Arg Ile Ser Val Glu Arg Lys Ile	
4835	4840 4845 4850
tca atg agc gta agg gaa gct ggc att tat act att tca gcg ctg ggt	16726
Ser Met Ser Val Arg Glu Ala Gly Ile Tyr Thr Ile Ser Ala Leu Gly	
4855	4860 4865
gaa ggt gca gca gca aaa ggc cat aat att cta gag aaa acc att aaa	16774
Glu Gly Ala Ala Ala Lys Gly His Asn Ile Leu Glu Lys Thr Ile Lys	
4870	4875 4880
ccc ggt tcc ctg aag gct atc tat ggt gat aaa gct gag tca att ctt	16822
Pro Gly Ser Leu Lys Ala Ile Tyr Gly Asp Lys Ala Glu Ser Ile Leu	
4885	4890 4895
gga ctg gca aaa cgt agc ggt ctc gtt ggc cga gta gga cag tgg gat	16870
Gly Leu Ala Lys Arg Ser Gly Leu Val Gly Arg Val Gly Gln Trp Asp	
4900	4905 4910
gca tca ggt gta cgt gga att tat gcg cac aac aga ccg ggt ggt gag	16918
Ala Ser Gly Val Arg Gly Ile Tyr Ala His Asn Arg Pro Gly Gly Glu	
4915	4920 4925 4930
gat ttg gtt tat cct gtc agc ctg cag aat act tct gcc aat gaa att	16966
Asp Leu Val Tyr Pro Val Ser Leu Gln Asn Thr Ser Ala Asn Glu Ile	
4935	4940 4945

gtt aat gca tgg ata aaa ttt aaa atc atc acg ccc tac acc ggg gat 17014
Val Asn Ala Trp Ile Lys Phe Lys Ile Ile Thr Pro Tyr Thr Gly Asp
4950 4955 4960

tat gac atg cac gat att att aaa ttc tct gat ggg aaa ggg cat gtg 17062
Tyr Asp Met His Asp Ile Ile Lys Phe Ser Asp Gly Lys Gly His Val
4965 4970 4975

cct aca gcg gaa agt agt gag gaa aga gga gta aaa gat cta att aat 17110
Pro Thr Ala Glu Ser Ser Glu Glu Arg Gly Val Lys Asp Leu Ile Asn
4980 4985 4990

aaa ggt gtt gcg gag gtc gat cct tcc aga ccc ttt gag tat aca gcg 17158
Lys Gly Val Ala Glu Val Asp Pro Ser Arg Pro Phe Glu Tyr Thr Ala
4995 5000 5005 5010

atg aat gtt att cgc cat gga cca cag gtg aac ttt gtt ccc tat atg 17206
Met Asn Val Ile Arg His Gly Pro Gln Val Asn Phe Val Pro Tyr Met
5015 5020 5025

tgg gaa cat gag cac gat aaa gtc gtt aat gat aat ggt tat ctg ggg 17254
Trp Glu His Glu His Asp Lys Val Val Asn Asp Asn Gly Tyr Leu Gly
5030 5035 5040

gtg gta gct agc ccg ggg ccg ttc ccg gta gcg atg gta cat cag ggg 17302
Val Val Ala Ser Pro Gly Pro Phe Pro Val Ala Met Val His Gln Gly
5045 5050 5055

gaa tgg act gtt ttt gac aac agt gaa gaa ctg ttt aat ttc tat aaa 17350
Glu Trp Thr Val Phe Asp Asn Ser Glu Glu Leu Phe Asn Phe Tyr Lys
5060 5065 5070

tct aca aat aca cct ctt cct gaa cac tgg tcc caa gat ttt atg gac 17398
Ser Thr Asn Thr Pro Leu Pro Glu His Trp Ser Gln Asp Phe Met Asp
5075 5080 5085 5090

aga ggg aaa gga ata gtc gca act cct cgg cat gct gaa ctt ctt gat 17446
Arg Gly Lys Gly Ile Val Ala Thr Pro Arg His Ala Glu Leu Leu Asp
5095 5100 5105

aaa cga cga gtc atg tac taa tcgtaacgat ttctgcctt acccaaagta 17497
Lys Arg Arg Val Met Tyr *
5110

tacagcccggtg tgagacattt tctctgtctc atttggggttg tttttgtctc atctgcattgt 17557
tatgtcttcc ctcattctaaa gtctaaccgag acattttttag caaaatggca ctttacgggtt 17617
atgttcgcgt ttcaaccgac ggtccgggatt ttactctgta aatacagaca cttcgcgcag 17677
cctgctgcga aattatccgt gcgaaaaaag ccagcggcag cagccgggat ggacgaaatg 17737
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cgcttcaggt accggggccag gtatttcacg ctgcgcaggg cgccgcgggt ctttttggca 18637
aaattcactt tccagggggcg gcggtattgc gcatgcaggg tcttcgttgc ggatattggc 18697
gagaccggcg agggcgccag gattgatgc cagcaggtga acgacggcat tgcgccagat 18757
ggcttccacc tttttctttt taaagaacag ctgccgccag acgtggtgtt tgacgtcaag 18817
accgccgcgg gtaacggaga cgtggatatg cggatgttga ttgagctgcc ggccttaggt 18877

gtggagcgcg caaaaaatgc cggcctcgat gccctgccgg cgtgcccagc ggagcatggc 18937

<210> 2
 <211> 144
 <212> PRT
 <213> Serratia entomophila

<220>
 <223> ORF1 amino acid sequence encoding an insecticidal protein when
 linked with at least SEQ ID NO: 1

<400> 2
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 1 5 10 15
 Leu Arg Leu His Ala Tyr Arg Cys Ala Ala Asp Val Trp Thr Val Gly
 20 25 30
 Tyr Gly His Thr Ala Gly Val Thr Lys Gly Asp Ile Ile Thr Val Asp
 35 40 45
 Glu Ala Gln Thr Met Leu Thr Asn Asp Ile Thr Val Phe Glu Arg Ala
 50 55 60
 Val Ser Gln Ala Val Ala Val Pro Leu Asn Gln Ser Gln Tyr Asp Ala
 65 70 75 80
 Leu Val Ser Leu Val Phe Asn Ile Gly Gln Gly Asn Phe Lys Arg Ser
 85 90 95
 Thr Leu Leu Lys Lys Leu Asn Lys Gln Asp Tyr Val Gly Ala Gly Asn
 100 105 110
 Glu Phe Leu Arg Trp Thr Arg Ala Asn Gly Lys Val Leu Pro Gly Leu
 115 120 125
 Ile Arg Arg Arg Glu Ala Glu Arg Val Leu Phe Glu Lys Leu Gly Ala
 130 135 140

<210> 3
 <211> 191
 <212> PRT
 <213> Serratia entomophila

<220>
 <223> ORF2 amino acid sequence encoding an insecticidal protein when
 linked with at least SEQ ID NO: 1

<400> 3
 Met Ser Pro Ser Pro Leu Thr Gly Ala Ala Leu Met Glu Thr Lys Met
 1 5 10 15
 Lys Ile His Tyr Gln Val Ala Ala Val Val Leu Thr Gly Val Met Val
 20 25 30
 Trp Gly Leu Ser His Trp Arg Tyr Thr Val Gly Tyr His Ala Ala Asp
 35 40 45
 Thr Gln Trp Gln Gln Arg Gln Ala Glu Gln Glu Arg Ala Asp Ala Leu
 50 55 60
 Ala Leu Leu Ala Ala Glu Thr Arg Glu Arg Lys Trp Glu Gln Gln Arg
 65 70 75 80
 Gln Thr Asp Met Asn Lys Val Ala Ile His Ala Glu Glu Glu Leu Ala
 85 90 95
 Ala Ala Arg Asp Ala Ala Ala Asp Ala Gln Arg Thr Gly Gln Arg Leu
 100 105 110
 Gln His Thr Val Thr Thr Leu Gln Arg Gln Leu Ala Ser Arg Glu Thr
 115 120 125
 Arg Arg Leu Ser Ala Ala Thr Ala Ile Gly Thr Asp Asp Leu Gly Gly
 130 135 140
 Gln Pro Gly Val Leu Phe Ala Glu Leu Phe Arg Arg Ala Asp Gln Arg
 145 150 155 160
 Ala Gly Glu Leu Ala Ala Tyr Ala Asp Arg Thr Arg Val Lys Trp Gln
 165 170 175
 Ala Cys Gly Arg Ala Tyr Gln Ala Ala Thr His Glu Ala Glu Lys
 180 185 190

<210> 4
 <211> 2376
 <212> PRT
 <213> Serratia entomophila

<220>
 <223> SepA amino acid sequence encoding an insecticidal protein when
 linked with at least SEQ ID NO: 1

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 1 5 10 15
 Asn Ala Pro Arg Ala Arg Leu Ser Glu Glu Asn Asp Thr Ala Val Thr
 20 25 30
 Leu Thr Asp Leu Phe Ser Arg Ser Phe Pro Glu Val Lys Lys Ile Thr
 35 40 45
 Gly Asp Ser Leu Ser Trp Gly Glu Val Cys Tyr Leu Tyr Ser Gln Ala
 50 55 60
 Gln His Glu Gln Lys Glu Asn Arg Leu Thr Glu Ser Arg Ile Leu Ala
 65 70 75 80
 Arg Ala Asn Pro Leu Leu Val Asn Ala Val Arg Leu Gly Ile Arg Gln
 85 90 95
 Ala Ala Gly Ser Arg Ser Tyr Asp Asp Trp Phe Gly Ser Arg Ala Asp
 100 105 110
 Arg Phe Ala Arg Pro Gly Ser Val Ala Ser Met Phe Ser Pro Ala Ala
 115 120 125
 Tyr Leu Thr Glu Leu Tyr Arg Glu Ala Lys Asp Leu His Pro Asp Thr
 130 135 140
 Ser Leu Phe Arg Leu Asp Ile Arg Arg Pro Asp Leu Ala Ala Leu Ala
 145 150 155 160
 Leu Ser Gln Asn Asn Met Asp Asp Glu Leu Ser Thr Leu Ser Leu Ser
 165 170 175
 Asn Glu Leu Leu Tyr Arg Gly Ile Gly Ala Ala Glu Gly Leu Asp Asp
 180 185 190
 Asp Ser Val Arg Glu Leu Leu Ala Gly Tyr Arg Leu Thr Gly Leu Thr
 195 200 205
 Pro Tyr His Trp Ala Tyr Glu Ala Ala Arg Gln Ala Ile Leu Val Gln
 210 215 220
 Asp Pro Thr Leu Met Gly Phe Ser Arg Asn Pro Asp Val Ala Gln Leu
 225 230 235 240
 Met Asp Pro Ala Ser Met Leu Ala Ile Glu Ala Asp Ile Ser Pro Glu
 245 250 255
 Leu Tyr Gln Ile Leu Ala Glu Glu Ile Thr Thr Asp Ser Tyr Glu Ala
 260 265 270
 Leu Trp Ser Lys Asn Phe Gly Asp Met Pro Pro Ser Ser Leu Leu Ser
 275 280 285
 Tyr Asp Ala Leu Ala Thr Phe Tyr Asp Leu Asp Tyr Asp Glu Leu Thr
 290 295 300
 Ser Leu Leu Ser Leu Arg Leu Asp Phe Ser Asn Pro Asn Asn Glu Tyr
 305 310 315 320
 Tyr Ile Asn Ser Gln Leu Ser Val Val Thr Leu Asn Glu Ser Thr Gly
 325 330 335
 Leu Ile Thr Ile His His Tyr Leu Arg Thr Leu Gly Gly Asp Ser Gln
 340 345 350
 Gln Ile Asn Pro Glu Leu Ile Pro Tyr Gly Asp Gly Thr Tyr Leu Tyr
 355 360 365
 Asn Phe Ser Val Val Ser Thr Ile Ser Glu Asp Ser Phe Lys Leu Gly
 370 375 380
 Ser Leu Gly Ser Asn Ser Ser Asn Leu Tyr Ser Gly Asp Tyr Gln Leu
 385 390 395 400
 Gln Lys Gly Val Arg Tyr Ser Ile Pro Val Glu Ile Asp Glu Gly Lys
 405 410 415
 Leu Asn Asp Gly Ile Thr Ile Gly Leu Ser Arg Lys Gly Gly Tyr
 420 425 430
 Tyr Ser Thr Val Asn Phe Thr Leu Ile Glu Tyr Asp Pro Ala Ile Phe
 435 440 445

Ile	Leu	Lys	Leu	Asn	Lys	Val	Ile	Arg	Leu	Tyr	Lys	Ala	Thr	Gly	Met
450						455					460				
Thr	Thr	Ala	Glu	Ile	Tyr	Gln	Ile	Thr	Asn	Ile	Leu	Asn	Asn	Gly	Leu
465					470					475					480
Thr	Ile	Asp	His	Ala	Val	Leu	Ser	Lys	Ile	Phe	Leu	Val	Arg	Tyr	Leu
				485					490					495	
Met	Arg	His	Tyr	Gln	Leu	Asp	Val	Ala	Arg	Ser	Leu	Ile	Leu	Cys	Asn
			500					505					510		
Gly	Thr	Ile	Ser	Asp	Gln	Ala	Phe	Ser	Gly	Glu	Thr	Gly	Leu	Phe	Thr
		515					520					525			
Thr	Leu	Phe	Asn	Thr	Pro	Pro	Leu	Asn	Gly	Gln	Leu	Phe	Ser	Ala	Asp
	530					535					540				
Asp	Thr	Pro	Leu	Asp	Leu	Arg	Ser	Glu	Ala	Pro	Glu	Asp	Ala	Phe	Arg
545					550					555					560
Leu	Ser	Val	Leu	Lys	Arg	Ala	Phe	Asn	Ile	Ser	Ala	Ser	Gly	Leu	Ser
				565					570					575	
Thr	Leu	Trp	Gln	Leu	Ala	Ser	Gly	Asp	Ser	Ser	Ala	Gly	Phe	Ser	Cys
			580					585					590		
Ser	Ala	Asp	Asn	Ile	Ala	Ala	Leu	Tyr	Arg	Val	Lys	Leu	Leu	Ala	Asp
		595					600					605			
Ile	His	Asp	Leu	Ser	Ala	Gly	Glu	Leu	Ser	Met	Leu	Leu	Ser	Val	Ser
	610					615					620				
Pro	Phe	Ser	Gly	Val	Ala	Ala	Gly	Ser	Leu	Ser	Asp	Asn	Glu	Leu	Thr
625					630					635					640
Gln	Phe	Leu	Tyr	Gln	Thr	Thr	Thr	Trp	Leu	Thr	Glu	Gln	Gly	Trp	Thr
				645					650					655	
Val	Ser	Asp	Val	Phe	Leu	Met	Leu	Thr	Thr	Gln	Tyr	Gly	Thr	Leu	Leu
			660					665					670		
Thr	Pro	Asp	Ile	Glu	Asn	Leu	Leu	Ala	Ser	Leu	Arg	Asn	Gly	Leu	Ser
		675					680					685			
Gly	Arg	Glu	Leu	Phe	Pro	Glu	Thr	Leu	Pro	Gly	Asp	Gly	Ala	Pro	Phe
		690				695					700				
Ile	Ala	Ala	Ala	Met	Gln	Leu	Asp	Ala	Thr	Asp	Thr	Ala	Lys	Ala	Met
705					710					715					720
Leu	Thr	Trp	Ala	Asp	Gln	Leu	Lys	Pro	Glu	Gly	Leu	Thr	Leu	Thr	Glu
				725					730					735	
Phe	Ile	Leu	Leu	Val	Met	Asn	Ala	Ala	Pro	Asn	Asp	Glu	Gln	Ala	Gly
			740					745					750		
Gln	Met	Ala	Gly	Phe	Cys	Gln	Ala	Leu	Trp	Gln	Leu	Ala	Leu	Ile	Ile
			755				760					765			
Arg	Ser	Thr	Gly	Leu	Ser	Thr	Arg	Glu	Leu	Thr	Leu	Leu	Val	Ser	Gln
						775					780				
Pro	Gly	Arg	Phe	Arg	Thr	Gly	Trp	His	His	Leu	Pro	His	Asp	Leu	Pro
785					790					795					800
Ala	Leu	Arg	Asp	Ile	Thr	Arg	Phe	His	Ala	Val	Val	Asn	Arg	Ser	Gly
				805					810					815	
Ser	His	Ala	Gly	Glu	Val	Leu	Thr	Ala	Leu	Glu	Thr	Gly	Glu	Leu	Ser
			820					825					830		
Ser	Ala	Leu	Leu	Ala	Arg	Ala	Leu	Ser	Gln	Asn	Glu	Gln	Asp	Val	Thr
		835					840					845			
Gly	Ala	Leu	Ala	Gln	Val	Arg	Gly	Ala	Gly	Glu	Gln	Asp	Asn	Ser	Val
						855					860				
Phe	Thr	Ser	Trp	Glu	Glu	Val	Asp	Gln	Ala	Glu	Gln	Trp	Leu	Asp	Met
865					870					875					880
Ser	Glu	Thr	Leu	Ser	Ile	Thr	Pro	Ser	Gly	Leu	Ala	Ser	Leu	Ile	Ala
				885					890					895	
Leu	Lys	Tyr	Ile	Asn	Val	Ser	Asp	Asp	Ser	Ala	Pro	Leu	Tyr	Ser	Gln
			900					905					910		
Trp	Gln	Val	Val	Ser	Gly	Leu	Leu	Gln	Ala	Gly	Leu	Lys	Ser	Ser	Gln
		915					920					925			
Ser	Ser	Ala	Leu	His	Asp	Tyr	Leu	Glu	Glu	Gly	Thr	Ser	Ser	Ala	Leu
		930				935					940				
Cys	Ala	Tyr	Tyr	Leu	Arg	Asn	Leu	Ala	Pro	Asn	Met	Val	Ser	Gly	Arg
945					950					955					960
Asp	Asp	Leu	Phe	Gly	Tyr	Leu	Leu	Leu	Asp	Asn	Gln	Val	Ser	Ala	Lys
				965					970					975	
Val	Lys	Thr	Thr	Arg	Ile	Ala	Glu	Ala	Ile	Ala	Gly	Ile	Arg	Leu	Tyr

Ile	Asn	Arg	Ala	Leu	Asn	Gly	Ile	Glu	Leu	Ser	Ala	Met	Ala	Glu	Val
995							1000					1005			
Arg	Gly	Arg	Gln	Phe	Phe	Thr	Asp	Trp	Asp	Thr	Phe	Asn	Lys	Arg	Tyr
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Ser	Thr	Trp	Ala	Gly	Val	Ser	Glu	Leu	Val	Tyr	Tyr	Pro	Glu	Asn	Tyr
1025							1030				1035				1040
Leu	Asp	Pro	Thr	Val	Arg	Ile	Gly	Gln	Thr	Gly	Met	Met	Asp	Thr	Leu
							1045				1050				1055
Leu	Gln	Ser	Val	Ser	Gln	Ser	Ser	Ile	Asn	Arg	Asp	Thr	Val	Glu	Asp
							1060				1065				1070
Ala	Phe	Lys	Thr	Tyr	Leu	Thr	Thr	Phe	Glu	Gln	Ile	Ala	Asn	Leu	Asn
							1075				1080				1085
Thr	Val	Ser	Gly	Tyr	His	Asp	Asn	Ala	Ser	Met	Thr	Gln	Gly	Thr	Thr
							1090				1095				1100
Trp	Tyr	Val	Gly	Arg	Ser	Ile	Thr	Asp	Gln	Thr	Asn	Trp	Tyr	Trp	Arg
1105							1110				1115				1120
Ser	Ala	Asn	His	Ser	Lys	Ile	Gln	Asp	Ser	Met	Met	Pro	Ala	Asn	Ala
							1125				1130				1135
Trp	Thr	Gly	Trp	Thr	Lys	Ile	Asn	Cys	Gly	Met	Asn	Pro	Trp	Ser	Asp
							1140				1145				1150
Leu	Val	Cys	Ser	Val	Phe	Phe	Asn	Ser	Arg	Leu	Tyr	Val	Val	Trp	Val
							1155				1160				1165
Glu	Glu	Asn	Gln	Ser	Ala	Asp	Thr	Glu	Ala	Glu	Ser	Thr	Thr	Thr	Thr
							1170				1175				1180
Gln	Gln	Ser	Tyr	Thr	Leu	Lys	Leu	Ser	Phe	Arg	Arg	Tyr	Asp	Gly	Thr
1185							1190				1195				1200
Trp	Ser	Ser	Pro	Val	Ser	Phe	Asp	Ile	Thr	Gly	Asn	Ile	Ala	Phe	Pro
							1205				1210				1215
Glu	Thr	Gln	Gly	Met	His	Val	Thr	Cys	Asn	Pro	Leu	Thr	Glu	Gln	Leu
							1220				1225				1230
Tyr	Cys	Ala	Phe	Tyr	Ser	Val	Thr	Ser	Lys	Pro	Asp	Phe	Asp	Asn	Ala
							1235				1240				1245
Gln	Leu	Ile	Ser	Val	Asp	Asn	Asp	Met	Thr	Leu	Asn	Val	Ile	Ser	Asp
							1250				1255				1260
Ile	Gly	Ile	Phe	Lys	Ser	Val	Ser	His	Glu	Phe	Asn	Thr	Ser	Thr	Glu
1265							1270				1275				1280
Lys	Phe	Ile	Asn	Asn	Val	Phe	Ser	Asp	Pro	Ser	Ala	Asn	Tyr	Phe	Val
							1285				1290				1295
Ser	Ala	Thr	Ser	Leu	Ile	Asp	Asp	Val	Ile	His	Ser	Asp	Phe	Ser	Leu
							1300				1305				1310
Leu	Asn	Ser	Lys	Thr	Thr	Ser	Thr	Val	Phe	Thr	Asn	Glu	Asp	Ser	Ser
							1315				1320				1325
Leu	Leu	Thr	Pro	Glu	Leu	His	Ile	Thr	Ala	Asn	Val	Ser	Cys	Phe	Val
							1330				1335				1340
Ser	Thr	Ala	Gly	Ile	Ala	Thr	Gln	Ser	Thr	Ile	Glu	Lys	Phe	Val	Gln
1345							1350				1355				1360
Ala	Gly	Ile	Glu	Phe	Glu	Glu	Ile	Asn	Phe	Tyr	Ala	Gly	Gln	Ala	Ala
							1365				1370				1375
Gly	Gly	Phe	Asp	Gly	Phe	Val	Gly	Val	Asp	Val	Ser	Asn	Ser	Lys	Val
							1380				1385				1390
Tyr	Gln	Val	Gly	Lys	Glu	Ala	Val	Gly	Val	Thr	Val	Lys	Ser	Tyr	Ser
							1395				1400				1405
Val	Thr	Gly	Val	Ser	Gly	Ser	Val	Glu	Leu	Phe	Ile	Asp	Ser	Ser	Asn
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Lys	Tyr	Phe	Ser	Gly	Ile	Leu	Ser	Asp	Lys	Met	Ile	Thr	Ala	Leu	Ile
1425							1430				1435				1440
Ser	Gly	Ser	Thr	Ser	Lys	Val	Asn	Tyr	Val	Ser	Ser	Ile	Gly	Ser	Gln
							1445				1450				1455
Asp	Phe	Trp	Ser	Val	Lys	Ser	Leu	Met	Pro	Ala	Leu	Gln	Ile	Tyr	Glu
							1460				1465				1470
Leu	Ile	Asp	Asp	Ile	Ile	Leu	Thr	Ser	Gly	Val	Asn	Gly	Thr	Glu	Ile
							1475				1480				1485
Lys	Ser	Trp	Pro	Ser	Ala	Glu	Trp	Tyr	Asn	Asp	Lys	Leu	Ser	Leu	Gln
							1490				1495				1500
Ser	Gly	Asn	Asn	Leu	Phe	Asn	Thr	Lys	Ser	Leu	Ser	Phe	Thr	Val	Asn
1505							1510				1515				1520

Thr Ser Asp Ile Val Glu Asp Glu Phe Asp Val Thr Phe Thr Phe Thr
 1525 1530 1535
 Ala Val Asp Gln Asn Asn Val Val Leu Ala Ala Arg Thr Ala Ile Leu
 1540 1545 1550
 Thr Val Ile Arg Asn Ile Asn Asn Asp Thr Ser Val Ile Ala Leu Arg
 1555 1560 1565
 Lys Asn Thr Arg Gly Ala Gln Tyr Ile Arg Phe Thr Ala Gly Asn Asp
 1570 1575 1580
 Val Ala Leu Ile Arg Leu Asn Thr Leu Phe Ala Arg Gln Leu Val Asp
 1585 1590 1595 1600
 Arg Ala Asn Thr Gly Ile Asp Thr Ile Leu Ser Met Glu Thr Gln Arg
 1605 1610 1615
 Leu Thr Glu Pro Ala Leu Glu Glu Gly Ser Asp Val Phe Met Asp Phe
 1620 1625 1630
 Ser Gly Ala Asn Ala Leu Tyr Phe Trp Glu Leu Phe Tyr Tyr Thr Pro
 1635 1640 1645
 Met Met Val Phe Gln Arg Leu Leu Gln Glu Gln His Phe Pro Glu Ala
 1650 1655 1660
 Thr Arg Trp Leu Gln Tyr Val Trp Asn Pro Ala Gly His Val Val Asn
 1665 1670 1675 1680
 Gly Val Leu Gln Asn Tyr Thr Trp Asn Val Arg Pro Leu Glu Glu Asp
 1685 1690 1695
 Thr Gly Trp Asn Asp Ser Pro Leu Asp Ser Ile Asp Pro Asp Ala Ile
 1700 1705 1710
 Ala Gln Tyr Asp Pro Met His Tyr Lys Val Ala Thr Phe Met Ser Tyr
 1715 1720 1725
 Leu Asp Leu Leu Ile Ala Arg Gly Asp Ala Ala Tyr Arg Leu Leu Glu
 1730 1735 1740
 Arg Asp Thr Leu Asn Glu Ala Arg Met Trp Tyr Val Gln Ala Leu Asn
 1745 1750 1755 1760
 Leu Leu Gly Asp Glu Pro Tyr Ile Ser Phe Asp Ala Asp Trp Ser Ala
 1765 1770 1775
 Leu Thr Leu Gly Asp Ala Ala Ser Glu Val Thr Arg Arg Asp Tyr Gln
 1780 1785 1790
 Glu Ala Leu Leu Ala Val Arg Arg Leu Val Pro Ala Pro Glu Thr Arg
 1795 1800 1805
 Thr Ala Asn Ser Leu Thr Ala Leu Phe Leu Pro Gln Gln Asn Glu Val
 1810 1815 1820
 Leu Lys Gly Tyr Trp Gln Thr Leu Ala Gln Arg Leu His Asn Leu Arg
 1825 1830 1835 1840
 His Asn Leu Ser Ile Asp Gly Gln Pro Leu Ser Leu Ser Val Tyr Ala
 1845 1850 1855
 Thr Pro Ser Glu Pro Ser Ala Leu Gln Ser Ala Val Val Asn Ser Ala
 1860 1865 1870
 Gln Gly Ala Ala Ala Leu Pro Ala Ala Val Met Pro Leu Tyr Ser Phe
 1875 1880 1885
 Pro Val Met Leu Glu Asn Ala Arg Gly Met Val Ser Leu Leu Thr Gly
 1890 1895 1900
 Phe Gly Asn Thr Leu Leu Gly Ile Thr Glu Arg Gln Asp Ala Glu Ala
 1905 1910 1915 1920
 Leu Ala Lys Leu Leu Gln Thr Gln Gly Ser Glu Leu Ile Arg Gln Gly
 1925 1930 1935
 Leu Arg Gln Gln Asp Asn Val Leu Glu Glu Ile Asp Ala Asp Ile Ala
 1940 1945 1950
 Ala Leu Glu Glu Ser Arg Arg Gly Ala Gln Met Arg Phe Glu Arg Tyr
 1955 1960 1965
 Lys Val Leu Tyr Glu Ala Asp Val Asn Thr Gly Glu Lys Gln Ala Met
 1970 1975 1980
 Asp Leu Tyr Leu Ser Ser Ser Val Leu Ser Ala Ser Thr Ala Ala Leu
 1985 1990 1995 2000
 Phe Leu Ala Glu Ala Ala Asp Met Leu Pro Asn Ile Tyr Gly Leu
 2005 2010 2015
 Ala Val Gly Gly Ser Arg Tyr Gly Ala Leu Phe Lys Ala Thr Ala Ile
 2020 2025 2030
 Gly Ile Gln Val Ser Ser Asp Ala Thr Arg Ile Ser Ala Asp Lys Ile
 2035 2040 2045
 Ser Gln Ser Glu Val Tyr Arg Arg Arg Arg Glu Glu Trp Glu Ile Gln

2050	2055	2060
Arg Asp Ser Ala Gln Ser Asp Val Ala Gln Ile Asp Ala Gln Leu Ala		
2065	2070	2075
Ala Met Ala Val Arg Arg Glu Gly Ala Glu Leu Gln Lys Thr Tyr Leu		2080
	2085	2090
Glu Thr Gln Gln Thr Gln Ala Gln Ala Gln Leu Ala Phe Leu Gln Ser		2095
	2100	2105
Lys Phe Asn Asn Thr Ala Leu Tyr Ser Trp Leu Arg Gly Arg Leu Ser		2110
	2115	2120
Ala Ile Tyr Tyr Gln Phe Tyr Asp Leu Ala Val Ser Arg Cys Leu Met		2125
	2130	2135
Ala Gln Gln Ala Trp Gln Trp Asp Lys Phe Glu Thr Arg Ser Phe Ile		2140
2145	2150	2155
Gln Pro Gly Ala Trp Met Gly Ala Asn Ala Gly Leu Leu Ala Gly Glu		2160
	2165	2170
Thr Leu Met Leu Asn Leu Ala Gln Met Glu Gln Ala Trp Leu Thr Gly		2175
	2180	2185
Asp Glu Arg Ala Ile Glu Val Thr Arg Thr Val Cys Leu Ser Glu Val		2190
	2195	2200
Tyr Thr Ser Leu Ala Glu Asp Ala Ala Phe Ser Leu Ala Asp Lys Val		2205
	2210	2215
Val Glu Leu Val Ser Asn Gly Ser Gly Ser Ala Gly Thr Lys Ser Asn		2220
2225	2230	2235
Gly Leu Gln Met Asp Gln Gln Gln Leu Glu Ala Thr Leu Lys Leu Ala		2240
	2245	2250
Asp Leu Gly Ile Gly Asn Asp Tyr Pro Val Ser Leu Gly Thr Met Arg		2255
	2260	2265
Arg Ile Lys Gln Ile Ser Val Thr Leu Pro Ala Leu Val Gly Pro Tyr		2270
	2275	2280
Gln Asp Val Arg Ala Val Leu Ser Tyr Gly Gly Ser Met Val Met Pro		2285
	2290	2295
Arg Gly Cys Ser Ala Leu Ala Val Ser His Gly Met Asn Asp Ser Gly		2300
2305	2310	2315
Gln Phe Gln Leu Asp Phe Asn Asp Pro Arg Tyr Leu Pro Phe Glu Gly		2320
	2325	2330
Leu Pro Val Asp Asp Thr Gly Thr Leu Thr Leu Ser Phe Pro Asp Ala		2335
	2340	2345
Asp Gly Lys Gln Gln Ala Met Leu Leu Ser Leu Ser Asp Ile Ile Leu		2350
	2355	2360
His Ile Arg Tyr Thr Ile Ile Ser		2365
2370	2375	

<210> 5

<211> 1428

<212> PRT

<213> Serratia entomophila

<220>

<223> SepB amino acid sequence encoding an insecticidal protein when linked with at least SEQ ID NO: 1

<400> 5

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	30
Arg Gly Tyr Ala Pro Thr Gly Ala Leu Asn Tyr His Ser Arg Ser Gly	35
	40
Asn Gly Pro Phe Gly Ile Gly Trp Gly Ile Gly Gly Ala Ala Val Gln	45
65	50
Arg Arg Thr Arg Asn Gly Ala Pro Thr Tyr Asp Asp Thr Asp Glu Phe	55
	60
Thr Gly Pro Asp Gly Glu Val Leu Val Pro Ala Leu Thr Ala Ala Gly	65
	70
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	90
	95
	100
	105
	110

Thr Gln Glu Ala Arg Gln Ala Thr Ser Leu Leu Gly Ile Asn Pro Gly
 115 120 125
 Gly Ser Phe Asn Val Gln Val Tyr Arg Ser Arg Thr Glu Gly Ser Leu
 130 135 140
 Ser Arg Leu Glu Arg Trp Leu Pro Ala Asp Glu Thr Glu Thr Glu Phe
 145 150 155 160
 Trp Val Leu Tyr Thr Pro Asp Gly Gln Val Ala Leu Leu Gly Arg Asn
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 Ala Gln Ala Arg Ile Ser Asn Pro Thr Ala Pro Thr Gln Thr Ala Val
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 Trp Leu Met Glu Ser Ser Val Ser Leu Thr Gly Glu Gln Met Tyr Tyr
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 Ala His Pro Gln Ala Gly Ala Gln Arg Tyr Pro Val Ala Val Trp Tyr
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 Gly Asn Arg Gln Ala Ala Arg Thr Leu Pro Ala Leu Val Ser Thr Pro
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 Ser Met Asp Ser Trp Leu Phe Ile Leu Val Phe Asp Tyr Gly Glu Arg
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 Ser Ser Val Leu Ser Glu Ala Pro Ala Trp Gln Thr Pro Gly Ser Gly
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 Pro Thr Met Pro Ala Leu His Asn Ser Gly Ile Leu Ala Asp Leu Asn
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 His Gly Arg Phe Gly Gln Pro Val Asn Ile Pro Gly Phe Ser Gln Ser
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 Val Thr Thr Phe Asn Pro Asp Gln Ile Leu Leu Ala Asp Thr Asp Gly
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 Ser Gly Thr Thr Asp Leu Ile Tyr Ala Met Ser Asp Arg Leu Val Ile
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 Tyr Phe Asn Gln Ser Gly Asn Tyr Phe Ala Glu Pro His Thr Leu Leu

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 Asp Ile Gln Gly Leu Gly Val Pro Ser Leu Leu Leu Thr Val Pro His
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 Val Ala Pro His His Trp Val Cys His Leu Ser Ala Asp Lys Pro Trp
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 Ala Ala Gly Ser Ser Pro Ala Cys Tyr Leu Pro Phe Thr Leu His Thr
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 Leu Trp Arg Ser Val Val Gln Asp Glu Ile Thr Gly Asn Arg Leu Val
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 Ser Asp Val Leu Tyr Arg His Gly Val Trp Asp Gly Gln Glu Arg Glu
 770 775 780
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 Ser Gln Gly Thr Ala Thr Glu Leu Ser Met Pro Ser Val Ser Arg Asn
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 Glu Leu Tyr Gly Ala Asp Gly Ser Ser Gln Ala Asp Ile Pro Tyr Ser
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 Val Thr Glu Ser Arg Pro Gln Val Arg Leu Val Glu Ala Asn Gly Asp
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 Gly Leu Gln Gln Ser Ser Ala His His Leu Val Ser Leu Ser Glu Gly
 995 1000 1005
 His Trp Leu Leu Gly Leu Ala Glu Ala Ser Arg Asp Asp Val Phe Thr
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Tyr Asp Trp Arg Phe Leu Thr Pro Val Arg Val Thr Asp Pro Asn Asp
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 Arg Gly Ser Leu Ser Gln Ser Ala Asp Pro Arg Leu His Ala Ala Gly
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 Leu Thr Asn Phe Thr Tyr Leu Asn Ser Leu Thr Gly Thr Val Leu Gln
 65 70 75 80
 Ser Val Ser Ala Asp Ala Gly Thr Ser Leu Glu Leu Ser Asp Ala Ala
 85 90 95
 Gly Arg Ala Phe Leu Ala Val Thr Gly Ala Gly Thr Glu Asp Ala Val
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 Thr Arg Thr Trp Gln Tyr Glu Asp Asp Thr Leu Pro Gly Arg Pro Leu
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 Ser Ile Thr Glu Gln Val Thr Gly Glu Ala Ala Gln Ile Thr Glu Arg
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 Phe Val Tyr Ala Gly Asn Thr Asp Ala Glu Lys Ile Leu Asn Leu Ala
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 Gly Gln Cys Val Ser His Tyr Asp Thr Ala Gly Leu Val Gln Thr Asp
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Ser Ile Ala Leu Ser Gly Val Pro Leu Ala Val Thr Arg Gln Leu Leu
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 Pro Asp Ala Ala Gly Ala Asn Trp Met Gly Glu Asp Ala Ser Ala Trp
 195 200 205
 Asn Asp Leu Leu Asp Gly Glu Thr Phe Phe Thr Gln Thr His Ala Asp
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 Ala Thr Gly Ala Val Leu Ser Ile Thr Asp Ala Lys Gly Asn Leu Gln
 225 230 235 240
 Arg Val Ala Tyr Asp Val Ala Gly Leu Leu Ser Gly Ser Trp Leu Thr
 245 250 255
 Leu Lys Asp Gly Thr Glu Gln Val Ile Val Ala Ser Leu Thr Tyr Ser
 260 265 270
 Ala Ala Gly Lys Lys Leu Arg Glu Glu His Gly Asn Gly Val Val Thr
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 Ser Tyr Ile Tyr Glu Pro Glu Thr Gln Arg Leu Thr Gly Ile Lys Thr
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 Glu Arg Pro Ser Gly His Val Ala Gly Ala Lys Val Leu Gln Asp Leu
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 325 330 335
 Ala Glu Glu Thr Arg Phe Trp Arg Asn Gln Lys Val Val Pro Glu Asn
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 Thr Tyr Ile Tyr Asp Ser Leu Tyr Gln Leu Val Ser Ala Thr Gly Arg
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 Asp Met Leu Phe Ser Ala Gly Gly His Gln Lys His Leu Gln Pro Gly
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 Gln Ala Leu Val Trp Thr Pro Arg Gly Glu Leu Gln Lys Val Thr Pro
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 Val Val Arg Asp Gly Gly Ala Asp Asp Ser Glu Ser Tyr Arg Tyr Asp
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 Ala Gly Ser Gln Arg Ile Ile Lys Thr Gly Thr Arg Gln Thr Gly Asn
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 Gly Lys Pro Asp Asp Leu Asp Glu Asp Ser Val Arg Tyr Ser Tyr Asp
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 Asn Leu Val Gly Ser Ser Gln Leu Glu Leu Asp Arg Glu Gly Tyr Leu
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 Ile Ser Glu Glu Glu Phe Tyr Pro Tyr Gly Gly Thr Ala Val Leu Thr
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 Lys Glu Arg Asp Ala Thr Gly Leu Asp Tyr Tyr Gly Tyr Arg Tyr Tyr
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 Phe Asp Ser Asn Gly Arg Ile Ser Thr Gly Gln Glu Ala Arg Arg Leu
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 Val Gly Glu Ala Phe Val His Pro Leu His Met Pro Val Phe Glu Arg
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 Ile Ser Val Glu Arg Lys Ile Ser Met Ser Val Arg Glu Ala Gly Ile

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Tyr	Thr	Ile	Ser	Ala	Leu	Gly	Glu	Gly	Ala	Ala	Ala	Lys	Gly	His
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Ile	Leu	Glu	Lys	Thr	Ile	Lys	Pro	Gly	Ser	Leu	Lys	Ala	Ile	Tyr
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Asp	Lys	Ala	Glu	Ser	Ile	Leu	Gly	Leu	Ala	Lys	Arg	Ser	Gly	Leu
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His	Asn	Arg	Pro	Gly	Gly	Glu	Asp	Leu	Val	Tyr	Pro	Val	Ser	Leu
785					790					795				800
Asn	Thr	Ser	Ala	Asn	Glu	Ile	Val	Asn	Ala	Trp	Ile	Lys	Phe	Lys
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Ile	Thr	Pro	Tyr	Thr	Gly	Asp	Tyr	Asp	Met	His	Asp	Ile	Ile	Lys
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Arg	Pro	Phe	Glu	Tyr	Thr	Ala	Met	Asn	Val	Ile	Arg	His	Gly	Pro
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Asn	Asp	Asn	Gly	Tyr	Leu	Gly	Val	Val	Ala	Ser	Pro	Gly	Pro	Phe
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Val	Ala	Met	Val	His	Gln	Gly	Glu	Trp	Thr	Val	Phe	Asp	Asn	Ser
		915					920					925		
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Trp	Ser	Gln	Asp	Phe	Met	Asp	Arg	Gly	Lys	Gly	Ile	Val	Ala	Thr
945					950					955				960
Arg	His	Ala	Glu	Leu	Leu	Asp	Lys	Arg	Arg	Val	Met	Tyr		
				965					970					